The use of balloon catheters has grown rapidly without scientific controls.[5] Though we are convinced that percutaneous transluminal aortic valvuloplasty has a role in those considered to be unsuitable candidates for surgery, or perhaps those who do not wish to undergo surgery, we do not advocate its widespread use as an alternative to aortic valve replacement, which should be contemplated only as part of a controlled scientific study.

An aortic valvuloplasty registry is proposed; those who wish to participate should contact Dr Jackson.

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Unemployment and mortality: comparison of the 1971 and 1981 longitudinal study census samples

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Abstract

Mortality in the period 1981-3 among men in the Office of Population Censuses and Surveys longitudinal study who were seeking work in 1981 was examined to investigate whether the finding of a high mortality rate among a comparable group of men who were followed up from the 1971 Census was repeated despite appreciable changes in the size and structure of the labour force over the intervening years. The pattern of mortality shortly after both censuses suggests that sick unemployed men were not categorised as seeking work, and it is concluded that for both samples the mortality of those who were reported to be seeking work was raised for reasons other than initial poor health. Other findings from the two censuses are also broadly similar. If confirmed after longer follow up this will add considerably to the evidence of the adverse health consequences of unemployment.

Introduction

The rise in unemployment since the mid-1960s, which accelerated in the early 1980s and shows little sign of diminishing, has led to much concern about the relation between unemployment and health. A principal concern of researchers is to disentangle the temporal associations between unemployment and a variety of measures of ill health.[1] Two questions summarise much of the debate. Firstly, does unemployment cause a deterioration in health or, conversely, are the sick most likely to become unemployed? Secondly, does unemployment lead to poverty and other forms of disadvantage, which we know are associated with poor health, or are unemployment and poor health related because they are both associated with a previous low socioeconomic state, poorer education, and worse housing conditions?

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Changes in the level of unemployment are likely to have a direct effect on the findings of research into issues that are relevant to these questions. "When there is a lot going on almost everyone can find a job; when there is little, almost anyone can lose the job he has. It follows that those who are unemployed at a time of low unemployment are likely to have special problems, for whatever reasons; while in a period of high unemployment the unemployed will consist in increasing numbers of essentially 'ordinary' people down on their luck."[2]

We present the first analysis of mortality in the period 1981-3 of a group of men and women who were followed up prospectively from the 1981 Census, identifying in particular men who were unemployed in the week preceding the census and women who were married to unemployed men. Earlier analyses of deaths during 1971-81 from the Office of Population Censuses and Surveys longitudinal study showed that men who had been unemployed in 1971 had higher mortality rates than other men of the same age, even after accounting for factors such as social class, housing tenure, region of residence, and marital state.[3-5] Particularly high standardised mortality ratios were noted for suicide, lung cancer, and ischaemic heart disease.[3] The mortality of the wives of unemployed men was also higher than that of other married women. This finding persisted when allowance was made for their own economic activity and housing tenure.[3,4] These observations and the suggestion that the relative mortality of unemployed men rose as the duration of follow up increased were considered to support suggestions that raised mortality was a consequence, perhaps an indirect one, of unemployment.

Analysis of mortality in the longitudinal study after the 1981 Census can as yet be based only on data to the end of 1983. Because of the increased levels of unemployment, however, larger numbers of deaths are available for analysis than in the comparable period of follow up after the 1971 Census. Our purpose was to see whether patterns of mortality that were observed for unemployed men and the wives of unemployed men who were identified in a period of high unemployment were similar to those observed in an earlier period of relatively low unemployment.

Kelvin and Jarrett suggested that more "ordinary" people are affected by unemployment in the 1980s than was the case in the 1970s. If this is correct then the hypothesis that pre-existing ill health or deprivation produced higher mortality among the unemployed in the 1970s might lead to the expectation of a weaker association between unemployment and mortality in our more recent data. It might also be argued that a widening of the experience of unemployment across the community might reduce the stigma associated with being unemployed and even strengthen networks of support available to unemployed people and their

families. The effect of these might also be to weaken the association with mortality.

Conversely, unemployment in the 1980s is usually quite a different experience for those who are directly affected than it was in the 1970s. It is generally of much longer duration and there is less prospect of re-employment for many of those affected.[6] Consequently, it is increasingly associated with greater hardship and loss of status. These factors suggest that there is likely to be an increase in adverse health consequences. By comparing the mortality of the 1981 cohort with that of the 1971 cohort we sought to shed light on which of the above arguments appears on balance to be supported by these new data.

Subjects and methods

The source of the data and the methods used here were summarised in our first report on unemployment and mortality[3] and were described in more detail in a general report on sociodemographic differentials in mortality during the early years of the study.[7] It should be noted that correction of a minor error in the computer algorithm which calculated age at death has led to some small discrepancies between figures in these early reports and those presented here, but the conclusions of the earlier work are not affected.

The mortality described here relates to those members of the longitudinal study who were identified in the 1981 Census[8] and whose record was traced in the National Health Service Central Register. We also restricted our attention to persons who were usually resident in England and Wales at the 1981 Census. These are equivalent criteria to those used in the original 1971 Census follow up.

As before, we concentrated on men who were recorded as seeking work in the week before the census. This specifically excluded men who indicated that they were prevented by temporary sickness from seeking work or that they were permanently sick.[9] In the 1981 Census men who were waiting to take up a job were also classified separately from those who were seeking work.

Of those people in the longitudinal study whose mortality we followed up in these analyses, there were 14 675 men of working age who were recorded as seeking work at the 1981 Census and 6889 women married to a man of working age who was seeking work. These compare with the 5861 men and 2906 married women in the 1971 Census. As before we used social class and housing tenure as indicators of socioeconomic state at the time of the census.

Results

Between 1971 and 1981 the percentage of men of working age in the longitudinal study who were in employment fell from 87% to 81%.[10] Changes in the distribution of men by economic activity between the 1971 and 1981 censuses suggest that at a time of higher unemployment higher proportions of men report themselves as retired or permanently sick, whereas in better times they describe themselves as looking for work (fig 1). The increase in the numbers who were permanently sick was particularly great at older working ages, when the prospects for obtaining another job are substantially reduced.[6] Men at younger ages who are out of work hope to work again, and so most refer to themselves as seeking work. A large increase, however, in the proportion of men who were retired was evident only at ages 60 and above, allowing for some ambivalence in relating this phenomenon solely to higher unemployment rates.[10] In view of these inter-relationships an analysis of the mortality of those who were seeking work cannot be undertaken without considering these other categories.

OVERALL MORTALITY AMONG MEN SEEKING WORK

Table I shows the overall mortality patterns in 1971-3 and 1981-3 by economic position for men of working age in the 1971 and 1981 censuses. In both cases men who were seeking work or who were retired or sick each had

TABLE I—*Comparison of mortality of men of working age at death by economic activity in 1971 and in 1981*

Economic activity	1971 Census*			1981 Census†		
	No observed	No expected	Standardised mortality ratio (95% confidence interval)	No observed	No expected	Standardised mortality ratio (95% confidence interval)
Employed	1781	2154·5	83 (79 to 87)	1211	1598·1	76 (71 to 80)
Temporarily sick	143	43·9	326 (274 to 382)	83	29·5	281 (224 to 348)
Waiting to take up a job	101	83·2	121 (98 to 147)	4	3·8	104 (28 to 267)
Seeking work				184	164·9	112 (96 to 129)
Permanently sick	283	67·3	421 (372 to 472)	387	110·0	352 (318 to 389)
Retired	87	47·3	184 (147 to 225)	109	69·8	156 (128 to 188)
Other men in the sample	30	28·8	104 (70 to 146)	23	24·9	92 (58 to 135)
All men of working age at death	2425	2425·0	100	2001	2001·0	100

*Deaths 1971-3, at ages 15-64. †Deaths 1981-3, at ages 16-64.

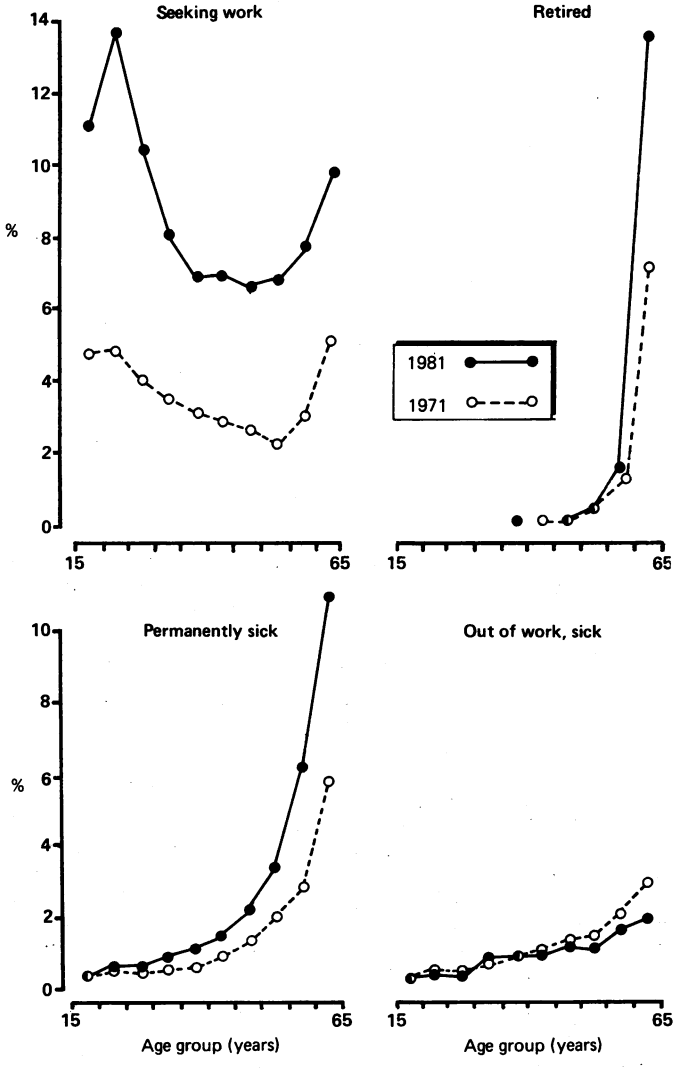

FIG 1—Percentage distribution of men by economic activity and age group in 1971 and in 1981. (For 1981 the youngest age group is 16-19, rather than 15-19, as in 1971.)

standardised mortality ratios above 100 (the level for all men of the same ages in the study); in contrast, men who were employed had standardised mortality ratios below 100. Table I also shows that the ratio for each economic position was lower in 1981-3 compared with the equivalent ratio in 1971-3. This apparent paradox is explained by the fall in the proportion of employed men and complementary rises in the proportions of men who were seeking work, retired, or permanently sick. The effect of these changes can be seen in the changes in the distribution of expected deaths.

For the period 1981-3 as a whole age specific mortality ratios for men who were seeking work at younger ages were higher than those at older ages (fig 2). This pattern is again similar to that for 1971-3. Two caveats need to be

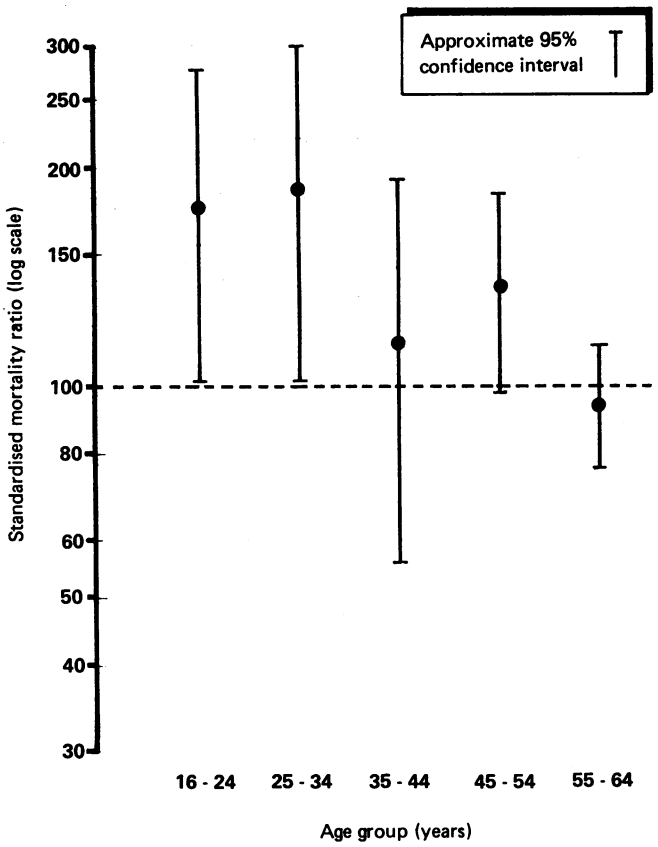

FIG 2—Mortality during 1981-3 of men who were seeking work in 1981, by age at death.

entered concerning this pattern with age. At younger ages the width of the confidence limits should be recognised. Indeed, the standardised mortality ratios of 182 and 189 for men aged 16-24 and 25-34 respectively are based on only 30 of the 197 deaths of men of working ages who were seeking work in 1981. There are, in short, too few deaths available at younger ages for them to be usefully disaggregated.

The second caveat is that at older working ages, as we indicated earlier, men who were both sick and unemployed often reported themselves as permanently sick. In consequence the mortality of sick unemployed men is reflected in the standardised mortality ratios for the permanently sick and not in the ratios for those seeking work, so that the ratios for the latter are initially lower than would otherwise have been the case (see table I and fig 2). This is part of a wider phenomenon that principally affects the employed population, whose low mortality is also evident in table I. Its effect on the employed population has been long recognised in published studies, where it is commonly referred to as the "healthy worker effect."[11] Typically, the mortality of those who were employed at the start of a follow up study is particularly low initially but gradually rises as the duration of follow up increases.[12,13]

Similarly, table II shows how the self exclusion of the sick from those who were reported as seeking work in both the 1971 and 1981 censuses led to the standardised mortality ratios among those seeking work changing as the length of follow up increased. In both instances the ratios for those who were seeking work were low in the census year and increased with longer follow up. For the earlier group, who were followed up the longest, this effect of

TABLE II—*Comparison of mortality of men who were seeking work in 1971 and in 1981 by age at death and year of death*

	Standardised mortality ratio (No of observed deaths)	Approximate 95% confidence interval
	1971 Census	
Aged 15-44 at death:		
1971-3	162 (18)	95 to 248
Aged 45-64 at death:		
1971	74 (14)	40 to 120
1972	134 (39)	95 to 181
1973	123 (30)	82 to 173
1971-3	115 (83)	91 to 142
	1981 Census	
Aged 16-44 at death:		
1981-3	160 (41)	115 to 217
Aged 45-64 at death:		
1981	63 (23)	39 to 92
1982	89 (45)	64 to 117
1983	145 (75)	113 to 180
1981-3	103 (143)	87 to 121

excluding the sick had largely disappeared by the end of the decade.[3] Further support for the suggestion that those who were reported as seeking work at the time of the census were an initially healthy group is shown by corresponding changes over time in standardised mortality ratios for the permanently sick.[10] It therefore appears that for men at older working ages the data for 1983 provide the most appropriate estimate we have of mortality among those who were seeking work in 1981. Furthermore, table II shows little support for the suggestion that high mortality among men who were seeking work in 1981 can be ascribed to them having lost their jobs as a consequence of ill health.

Despite considerable differences in the distributions by social class and housing tenure between those seeking work and all men of working age (see, for example, table III), standardising our results using these characteristics had little effect at ages 45-64.[10] At younger ages controlling for social class considerably reduced mortality excesses both in 1971-3 and in 1981-3, and thus social class differences probably explain why excesses at younger ages are so much greater than those at older ages. Even at younger ages, however, the effect of controlling for housing tenure was small.

TABLE III—*Social class distribution at ages 16-64 of men who were seeking work in 1981 compared with that of all men*

	All men aged 16-64	Men seeking work aged 16-64	
		No	As % of all men in that class
Social class:			
I	8248	181	2·2
II	32687	926	2·8
III non-manual	17339	793	4·6
III manual	53346	4531	8·5
IV	25347	2543	10·0
V	9131	1895	20·8
[I-V]	[146098]	[10869]	[7·4]
Armed forces	2030	79	3·9
Inadequately described	5199	3718	71·5
Unoccupied	10336	6	0·1
All men aged 16-64*	163680	14675	9·0

*Includes 17 men who were not allocated to a category in the main body of the table.

CAUSES OF DEATH

Table IV gives the causes of death in 1973 and 1983 for men of working age who were seeking work in 1971 and 1981 respectively. For the former cohort further confidence in these figures may be obtained by comparing them with subsequent mortality in the years 1974-81. For the 1981 cohort the highest standardised mortality ratio was that for accidents, poisonings, and violence, which included an equally large excess for suicides; ratios for both lung cancer and ischaemic heart disease were also significantly raised. This corresponds to the pattern established in 1974-81. In 1973 there were excesses for all these causes; with the exception of lung cancer, however, the ratios were lower and not significant at the 5% level.

TABLE IV—*Comparison of mortality of men who were seeking work in 1971 and in 1981 by cause of death, for selected years*

	1971 Census*				1981 Census†	
	Deaths in 1973		Deaths in 1974-81		Deaths in 1983	
	Standardised mortality ratio (No of observed deaths)	Approximate 95% confidence interval	Standardised mortality ratio (No of observed deaths)	Approximate 95% confidence interval	Standardised mortality ratio (No of observed deaths)	Approximate 95% confidence interval
All causes	130 (37)	91 to 177	145 (246)	127 to 164	147 (89)	118 to 180
Malignant neoplasms:	165 (13)	86 to 268	141 (68)	109 to 178	138 (25)	88 to 199
Lung cancer	286 (10)	134 to 495	174 (34)	120 to 239	209 (14)	112 to 336
Circulatory diseases:	110 (14)	59 to 177	121 (97)	98 to 147	159 (46)	116 to 210
Ischaemic heart disease	110 (10)	51 to 190	120 (71)	93 to 150	182 (39)	129 to 245
Respiratory diseases	154 (4)	38 to 346	165 (21)	101 to 245	91 (3)	16 to 226
Accidents, poisonings, and violence:	167 (5)	51 to 349	213 (33)	145 to 293	240 (12)	121 to 399
Suicide, etc‡	125 (1)	0 to 500	273 (18)	159 to 416	241 (7)	93 to 458

*Men seeking work in 1971 and aged 15-64 at death.
†Men seeking work in 1981 and aged 16-64 at death.
‡International Classification of Diseases 8th revision codes 850-877, 942, 950-959, 980-989.

MORTALITY AMONG WOMEN MARRIED TO MEN SEEKING WORK

Table V shows the mortality in 1981-3 of women whose husbands were aged 16-64 and seeking work in 1981. The overall standardised mortality ratio was 107, with an approximate 95% confidence interval of 82 to 138. The conclusions that may be drawn from this are unaltered if we look at the ratios for specific causes. Although a few of the ratios were raised—for example, that for lung cancer was 194 and that for ischaemic heart disease was 134—none differed significantly from 100 at the 5% level. Furthermore, no clear pattern emerges if we analyse these deaths by year of death or by finer age groups. This is not surprising in view of the small numbers; in addition, there is no obvious reason to expect that the mortality of these women would be particularly low initially, as was the case for the unemployed men, and hence to change with length of follow up.

Our principal concern was with comparisons of mortality in the period shortly after each census among men who were seeking work in 1971 and in 1981. The substantial rise in unemployment in the 1970s and early 1980s called into question the relevance to those who were unemployed in the 1980s of our findings with regard to mortality in 1971-81 of the earlier cohort. We therefore wished to know whether mortality patterns for these two cohorts differed. We argue that a similar pattern of mortality for the two cohorts, with differences only in the size of any excesses in mortality, would provide evidence for an effect of unemployment on health. It might also indicate whether the impact of this effect increased or decreased during times of high unemployment. Conversely, if patterns of mortality were substantially different this might suggest that the conclusions we drew from the earlier data reflected the characteristics of those who were out of work when unemployment levels were lower[2] rather than reflecting the impact of unemployment.

TABLE V—*Comparison of mortality of women who were married to men who were seeking work in 1971 and in 1981*

	1971 Census*		1981 Census†	
	Standardised mortality ratio (No of observed deaths)	Approximate 95% confidence interval	Standardised mortality ratio (No of observed deaths)	Approximate 95% confidence interval
All causes	100 (30)	67 to 139	107 (59)	82 to 138
Malignant neoplasms:	57 (7)	22 to 109	102 (28)	68 to 147
Lung cancer	67 (1)	0 to 267	194 (7)	78 to 399
Breast cancer	33 (1)	0 to 133	74 (6)	27 to 162
Circulatory diseases:	126 (14)	68 to 203	126 (22)	79 to 190
Ischaemic heart disease	182 (10)	85 to 315	134 (13)	72 to 230
Respiratory diseases	222 (4)	56 to 500	116 (2)	14 to 418
Accidents, poisonings, and violence:	67 (1)	0 to 267	68 (2)	8 to 245
Suicide, etc‡	— (0)		90 (1)	2 to 504

*Deaths 1971-3 at all ages of women married to men seeking work in 1971.
†Deaths 1981-3 at all ages of women married to men seeking work in 1981.
‡International Classification of Diseases 8th revision codes 850-877, 942, 950-959, 980-989.

Although we reported an excess mortality in 1971-81 for women who were married to men who were seeking work in 1971,[3] this excess was, similarly, not apparent for the period 1971-3. Indeed, in the earlier cohort there was no excess at all (standardised mortality ratio 100, confidence interval 67 to 139).

Discussion

This paper presents the first results of the analysis of mortality in 1981-3 of men in the Office of Population Censuses and Surveys longitudinal study who were unemployed in the week preceding the 1981 Census. Responses to census questions about economic activity are influenced by perceptions of current and future employment prospects, perceptions which reflect the age, sex, and health of the individual and the local and national economic climate. In focusing on the mortality of men who were seeking work it was also necessary to consider the mortality of the men who were permanently sick because it became clear that the group of men who were reported as seeking work in the census excluded many of those who were out of work and had existing health problems.

Because the longitudinal study contains household information it enables us to look at the mortality of other people in households that contain an unemployed man. It does not, however, contain a detailed record of the number or length of spells of unemployment nor is it large enough to allow us to be confident about the answers to some of the questions we have asked. To some extent this last limitation will be reduced when further mortality data for the 1980s become available for analysis.

Among men who were seeking work in 1981 and aged 45-64 at death we see a clear trend in mortality over the period 1981-3, with a standardised mortality ratio of 63 in 1981, 89 in 1982, and 145 in 1983. The importance of such trends in our analyses is confirmed if appropriate Poisson regression models are fitted to the data.[14] The relation between this trend and that for men who were permanently

sick, who had particularly high mortality in 1981,[10] suggests that men who were seeking work in 1981 excluded many with serious health problems in 1981. Among younger men this trend was less evident, partly because it was based on only a few deaths and partly because fewer men were reported as permanently sick since at this age serious health problems are less common than in middle age.

We therefore conclude that the standardised mortality ratio of 147 at ages 16-64 in 1983 is the best measure we have of overall mortality among men who were seeking work in our sample. A comparison with the equivalent analyses of those who were seeking work in 1971 shows that a similar pattern in fact operated shortly after that census. Despite an effect of social class distribution on the relatively small numbers of deaths at younger ages, correcting for socioeconomic characteristics had little effect on this overall figure.

Detailed comparisons of cause specific mortality by age and year of death also indicate similar patterns for the 1971 and 1981 cohorts.[10] These similarities include excess mortality from suicides and other accidents, poisonings, and violence at younger, but not at older, ages; a rising standardised mortality ratio for lung cancer at older ages, from low in 1981 and 1971 to high in 1983 and 1973; and a raised ratio for ischaemic heart disease at older ages in the final year of follow up but not in earlier years.

Women who were resident in private households and married to men aged 16-64 who were seeking work in 1981 had a standardised mortality ratio of 107 for 1981-3, with higher levels for lung cancer and ischaemic heart disease. None of these ratios, however, were significant at the 5% level, reflecting the fact that the numbers of deaths available for analysis from so short a follow up prevent us drawing firm conclusions about these women. It is notable, though, that there was also no clear excess in mortality in 1971-3 among the wives of men who were seeking work in 1971, although their mortality for 1971-81 was significantly raised. Thus it will be several years before these data can provide strong evidence that spouses of men who were unemployed in the 1980s suffer adverse health effects, as suggested by the longer period of follow up of the earlier group.

In a separate project we used the longitudinal study to indicate the sociodemographic origins in 1971 of men who were unemployed in 1981 and of the circumstances in 1981 of those who were unemployed in 1971.[15] The unpublished findings show that those who were out of work in 1981 were drawn disproportionately from socially disadvantaged sections of society in 1971, such as the unemployed, the unskilled, local authority tenants, and those who were separated and divorced. The risk of unemployment in England and Wales in 1981 was greater for men in the north, west, and central regions than for those in the south and the east. Hence it should not be surprising that some of the excess mortality found for unemployed men is associated with their sociodemographic circumstances.

The experiences of those who survived the decade between censuses shed most light on why there is still a substantial excess in mortality after standardising for socioeconomic circumstances. Men who were unemployed in 1971 were more likely than those who were in employment to experience in the following decade further unemployment, downward social class mobility, loss of owner occupied housing, and marriage breakdown. Not only are low sociodemographic states associated, perhaps indirectly, with higher mortality, but adverse changes in these characteristics have been implicated in conferring particularly high risks of mortality.[16] This seems to suggest that there is a descending spiral in which some people become increasingly at risk from one form of disadvantage after another. Unemployment may not be the principal link in this chain, but it is clearly an important link.

Conclusions

Our results relating to men who were seeking work in 1981 point in the same direction as the equivalent results for men who were seeking work in 1971. The high mortality which we observe in 1981-3 among men seeking work in 1981 who were aged 16-44 at death, and also in 1983 among those aged 45-64 at death, is not explained by either the pre-existing health of these groups or their socioeconomic state before unemployment. Also the postcensus mortalities of women who were married to men who were seeking work are similar in the two time periods.

A follow up longer than three years is needed, however, before the results for the 1980s have a strength and validity of their own. The figures for men aged 45-64 at death are dominated by strong health selection effects because those who were both out of work and had health problems tended to classify themselves as permanently sick and not as seeking work. This applies even when their health problems arose after they became unemployed (but before follow up started in this study). For younger men and for the wives of men who were seeking work the analyses are restricted by the small numbers of deaths occurring in so short a period. We hope to analyse in the next two years information on deaths up to 1985, which will help to some extent, but the analysis will become more valuable as the length of follow up increases still further.

These analyses are part of a review by members of the Social Statistics Research Unit at City University of mortality data available from the Office of Population Censuses and Surveys longitudinal study. (Crown copyright is reserved.) This programme is supported by a grant from the Medical Research Council. The views expressed are those of the authors.

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(Accepted 12 November 1986)

Corrections

Recent trends in mortality associated with abuse of volatile substances in the UK

We regret that an error occurred in this short report by Dr Anderson and others (6 December 1986, p 1472). The first sentence of the third paragraph of the methods and results should read: "In 53% of cases death was attributed to the direct toxic effects of the substance."

The fortification spectra of migraine

We regret that in this article by Dr Gordon T Plant (20-27 December 1986, p 1613) figures 3 and 4 were transposed.